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ABSTRACT

A course was designed at West Virginia University to provide educators with the fundamental skills and knowledge needed to successfully integrate and use computer-mediated communication (CMC) in their educational settings. Content was divided into progressive levels and delivered in the following three phases: (1) Internet hierarchy and access skills; (2) communication infrastructures; and (3) curriculum integration. Throughout the semester, in each of the phases of instruction, an opportunity was provided to assess individual concerns. The stages of concern questionnaire was used to measure participants' attitudes in an evaluation study; a repeated measures design was used, examining seven stages of concern to measure any changes across the semester. The study focused on assessing: (1) the effect of Internet instruction on students' attitudes toward Internet integration before, during and after instruction, and (2) the relationships of gender and computer knowledge on students' attitudes toward Internet integration before, during and after instruction. Results from the internal stages--awareness, informational, personal and management--yielded mixed results, with a general trend towards mitigation of initial concerns regarding the integration of this new innovation. All of the external concerns--consequence, collaboration and refocusing--increased as computer experience increased. Females were found to have higher mid concerns for external collaboration and refocusing. (AEF)

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Teachers' Stages of Concern Towards Internet Integration

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Teachers' Stages of Concern Towards Internet Integration

Background

Historically, the introduction and broad availability of new communication technologies have been shown to ultimately impact the educational system in some manner. Recent public accessibility to the vast assembly of resources available on the Internet has quickly revealed its inherent educational potential, and is rapidly impacting education on a broad scale. Swift acceptance of the Internet as a potential instructional tool has opened the door for its integration into the classroom. Requisite to this, however, is the instruction of educators in the use and incorporation of this new communication tool. It was this instructional need that encouraged the development of a computer-mediated communication (CMC) course designed specifically for educators.

Design of the course, Computers and Telecommunication in Education, centered on providing educators with the fundamental skills and knowledge base needed to successfully integrate and use CMC in their educational settings. Content was divided into progressive levels and delivered in the following three phases: I) Internet Hierarchy and Access Skills; II) Communication Infrastructures; III) Curriculum Integration (See Appendix A for a weekly breakdown of the course.). The progression from one phase to the next provided a mechanism for gradually acquiring an overall understanding of communication networks and the basic CMC skills prior to attempts at curriculum integration.

Rationale

The introduction of this new communication technology into education carries with it additional hurdles beyond those associated with the delivery of Internet-specific instruction. The course addressed: communication software, network topologies, telnet, ftp, e-mail, infrastructure, and integrating telecommunication into the existing curricula. Instruction was designed to be platform non-specific, so that users of IBMs or Macs could access the same tools, as could users with hard-wire or dial-up connections. With each phase of the course educators were presented with novel CMC situations that created different levels of individual concern regarding the use of the new innovation. Identification and understanding of these concerns is critical in the adoption and integration of the Internet in education. Thus the course provided a unique opportunity to assess individual concerns throughout the semester in each of the three phases of instruction.

One of the most widely used instruments for assessing teacher concerns related to innovations is the Stages of Concern Questionnaire (Hall, Rutherford and George, 1988, and with roots in the Concerns Based Adoption Model Project). In addition, one of the most potentially powerful tools available to educators today is the Internet. The Computers and Telecommunication

in Education class, taught to graduate students majoring in Education at WVU, had a primary focus to teach telecommunications rudiments not as ends in themselves, but as tools to use in curriculum development. To this end, the research presented here uses the Stages of Concern instrument to measure the various stages of concern of the participants as they progressed through the course and considered their own curricula.

Research Questions

Evaluation of student attitides as they evolved over time was the purpose of the study. The specific research questions guiding this study were (1) What is the effect of Internet instruction on students' attitudes toward integrating the Internet into their teaching before, during and after instruction? and (2) What are the relationships of gender, and various computer knowledge on students' attitudes toward Internet integration before, during and after instruction?

Design

The study employed a repeated measures design, looking at the seven stages of concern at the beginning, middle, and end of the course to measure any changes across the semester. The first four stages addressed in the Stages of Concern instrument target the learner's perceptions of the innovation as they relate to the internal focus (e.g., "I am interested in the innovation"). The last three stages in the instrument deal with the learner's perceptions of the innovation as they relate to the external focus (e.g., "I see how the innovation would affect my students"). We would therefore expect, for a novice target group, to see the internal stages decrease and the external stages increase over the course of instruction. For those individuals with more prior experience, the expectations would be that their external concerns increase earlier in a treatment (Reed, 1990).

Data Analysis

In answering the first research question, What is the effect of Internet instruction on students' attitudes toward integrating the Internet into their teaching before, during and after instruction?, seven two-factor (3 [data collection: pre-treatment, mid-treatment, post-treatment] X 1 [attitudes: stages of concern]) analyses of variance with a repeated measure on one factor (data collection) were conducted. Time of data collection served as the independent variable, and the means for each of the seven stages of concern were the dependent measures.

Answers to the second research question, What are the effects of gender, and various computer knowledge (general, content-area software, word processing software, database software, spreadsheet software, programming languages, authoring languages, hypermedia software, and Internet knowledge) on students' attitudes toward Internet integration before, during

and after instruction?, required conducting ten simple regressions. The various knowledge self-reported scores were used as predictors.

Discussion

Internal Concerns

The Stages of Concern model can be looked at from separate views. The first four stages—Awareness, Informational, Personal, and Management—are considered to be internal concerns, and are related to how the innovation—in this case the Internet—might affect the individual. For a typical innovation it is be expected that these concerns would initially be high, but would be mitigated during the course of the instruction.

The results from this study found the internal stages of concern yielding mixed results when viewed as an overall class. Some of them decreased with the course, while some increased. Most of the relationships between these internal stages and the predictors were negative, so that as various computer experience increased, these concerns were mitigated. However, the results showed a general trend towards mitigation of initial concerns regarding the integration of this new innovation. It is of importance to note that Gender analysis (see Table 1) over these internal concerns indicated significance only on Awareness-Post concerns, finding females tending to have lower awareness concerns at the end of the course than did males.

External Concerns

The last three stages—Consequence, Collaboration, and Refocusing—are considered to be external concerns, related to one's learning about the innovation and how that might affect others whom the learner may eventually teach about the innovation. As we progress in these higher external stages, we find the majority of learners being able to differentiate between appropriate and inappropriate uses of the innovation. In light of this we would anticipate that before, during and after the treatment—the Telecommunications course—that these three stages would progress from low to high. And in fact, all of the external based concerns did consistently increase. Also, all of the relationships between the predictors and these external stages were positive, so that as various computer experience increased, so did the concerns about how this innovation might be used in their learning environments. In addition, the data indicated Gender differences with respect to the external concerns at the midpoint for collaboration and refocusing. As the t value is + (see Table 2), females therefore tended to have higher mid concerns for the external collaboration and refocusing. This would be consistent with their having lower awareness concerns post treatment, if at that time they were already thinking about these external concerns at the midpoint.

REFERENCES

Hall, G. E., George, A. A., & Rutherford, W. L. (1977). *Measuring the stages of concern about an innovation: A manual for use of the stages of concern questionnaire.* Austin: Research and Development Center for Teacher Education, The University of Texas.

Reed, W. M. (1990). The effect of computer-and-writing instruction on prospective English teachers' attitudes toward and perceived uses of computers in writing instruction. *Journal of Research on Computing in Education, 23*(1), 3-27.

APPENDIX A

Schedule of Course Activities: TE 390: FALL Semester - 1994

DATE	TOPIC	PROCESS & CLASS ACTIVITY
Aug. 23	Course Introduction Logging On Access Skills	1. Internet Introduction 2. Course Introduction, Student Requirements 3. Log On procedures, keyboard config., and mail menus 4. Within "2" days send an e-mail message to the instructor
Aug. 30	Electronic Mail System File Management	1. Electronic Messaging, Menus, and Commands 2. Signature Files 3. Listserve 4. Text: Chapters 1 & 2 5. Kidsphere request on "How to Subscribe"
Sept. 06	Equipment Configuration Protocol Setting	1. Traditional Use of Computers/telecom. in Education 2. Network Overview & Information services - TELNET 3. Telnet Sessions 4. Text: Chapters 3 & 7 5. Send E-mail message to class with signature attached
Sept. 13	File Transfer: Windows & Mac	1. Ethernet & Modem file transfer 2. Windows & Mac environment 3. Temporary disk space 4. Downloading & uploading sessions 5. Text: Chapters 4 & 5 6. Conduct Library Search, prepare summary
Sept. 20	On-Line Searches - Gopher	1. Log on and command keys 2. Gopher menus & bookmarks 3. On-Line Services & Software Critique Formats 4. Text: Chapters 18 & 21 5. Upload, send instructor a document 6. Conduct a Telnet search; download small document
Sept. 27	On-Line Searches - Veronica	1. Veronica servers - location and access 2. Electronic search parameters 3. Veronica searches 4. Text: Chapter 22 5. Using Gopher, download a related document
Oct. 04	Student Presentations of On-Line Telecom. Software Packages	1. Overview of Commercial E-Mail Software Packages 2. Student Presentations of Telecommunication Software 3. Telecommunication Software Critique 4. Using Veronica, locate & download a related document
Oct. 11	Infrastructure Analysis	1. Networking and Infrastructures 2. Site Assessment Methods
Oct. 18	Infrastructure: Design & Planning	1. International Services and Opportunities 2. Applications to Educational/Business Environments
Oct. 25	Integration of Telecom. Curriculum	1. Analysis & Planning of Telecommunication Curriculum 2. Curriculum Development 3. Case Study of Educational Setting 4. Instructional Activities for Information Technology
Nov. 01	Hypertext Browsers	1. WWW and Hypermedia 2. Internet Browsers - Using Mosaic 3. Text: Chapters 23 & 24
Nov. 08	Expanded Ethernet Capabilities On-Line Services	1. Additional WWW Browsers 2. Fetch & Gopher 3. Student Presentations of On-Line Services 4. On-Line Services Critiques
Nov. 15	Current Telecom. Research National Trends Skills Review	1. Telecommunications Research in Education 2. Information Technology and the Future of Education 3. Trends in Using Telecommunications in Education 4. Internet Skills In Review 5. Locate, download, present a telecommunications article
Nov. 29	Student Presentations: Curriculum Packages	1. Telecommunication Curriculum Integration Packages 2. Unsubscribe to Kidsphere 3. Purge your account
Dec. 06	**FINAL EXAM**	1. Course Portfolios

Table 1. Internal Based Stages of Concerns Regression Summary.

	Awareness				Informational				Personal				Management		
	pre	mid	post		pre	mid	post		pre	mid	post		pre	mid	post
Gender			-S												
General	-T				-T								-S	-S	
Content			-S										-S		
Word Process					-S								-S	-T	
Data Base													-S		
Spreadsheet													-S	-T	
Programming	-T		-T										-S		
Authoring	-T						+T								
Hypermedia	-T						+S				+S				
Internet	-S		-T				+T			+S			-S		

+S = significant positive result ($p < .06$) | *+T = positive trend ($.07 < p < .20$)*

-S = significant negative result ($p < .06$) | *-T = negative trend ($.07 < p < .20$)*

Table 2. External Based Stages of Concerns Regression Summary.

	Consequence				Collaborative				Refocusing			
	pre	mid	post		pre	mid	post		pre	mid	post	
Gender		+T				+S				+S		
General												
Content	+S	+T			+S				+T	+T		
Word Process												
Data Base												
Spreadsheet												
Programming												
Authoring												
Hypermedia											+T	
Internet					+T					+T		

+S = significant positive result ($p < .06$) | *+T = positive trend ($.07 < p < .20$)*

-S = significant negative result ($p < .06$) | *-T = negative trend ($.07 < p < .20$)*